POLYANGIUM VITELLINUM LINK 1809

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All of the species of bacteria described and named before 1800 were regarded by their authors as protozoa. Several of the species described by Mueller were undoubtedly bacteria, but none are now known by the names he proposed. Two of his species were named Vibrio undula and Vibrio spirillum, but are now known as Spirillum undula and S. volutans, renamed by Ehrenberg in 1832. However, the latter author also included them among the protozoa.

Apparently the first species belonging to the bacteria and described as a plant is Polyangium vitellinum Link (1809) (1). As the oldest name applied to one of the bacteria, it is of considerable historic interest. Inasmuch as the original descriptions are often not easily accessible, it has been thought worth while to review the history of this interesting organism.

In the year 1809 Heinrich Friedrich Link, Professor in the University of Rostock, published a paper on "Observations on the Natural Orders of Plants, First Dissertation: including the Epiphytae, Mucedines, Gastromyci and Fungi." Under Fungi he describes 26 genera, with an appendix including three others. In this appendix as the second genus he describes Polyangium and the species P. vitellinum. The text of his paper is reproduced on page 130.

This minute organism was placed among the fungi. The egg-yolk-like sporangioles within the transparent sporangium bore some resemblance to one of the bird-nest fungi among the gasteromycetes. The contents of the sporangioles were not resolved by the microscope. There is no reference in the text to an illustration or drawing. An earlier paragraph describing the genus Sporidesmium has inserted in ink, in the volume consulted as reference, to a Figure 64. There is a Figure 65 without a legend which undoubtedly is a figure of Polyangium vitellinum; it has been so regarded by subsequent authors. The figure is here reproduced on page 130.

Inter Gastromycos ante Endogonen inserē:

Polyangium. *Sporangium globosum et oblongum læve. Sporangiola ratione sporangii maxima, oblonga, massa grumosa referta.*

Sporangium constituitur e membrana tenui, vesiculose gelatinosa, pellucida, complectente sporangiola 4-6 oblonga, massa grumosa colorata referta. Sporidia non vidimus.

P. vitellinum, minutum sparsum colore vitellino sub hoc ordine inter minutissimos referendum. Magnitudine grani sabuli majoris in truncis siccis dispersum aut solitarium, aut duobus tribusve aggregatis apparet, colore tantum obscuro vitellino agnoscendum. Invenit am. Ditmar.

Reproduction of Link's original description of the genus Polyangium and the species Polyangium vitellinum (1809).

Fig. 1. Polyangium vitellinum. Reproduction of Fig. 65 from Link's description (1809).

BACTERIOLOGICAL NOMENCLATURE
AND TAXONOMY

The next reference to Polyangium vitellinum is a description by Ditmar (1813) (2). The page of description is here reproduced as well as his figure (pp. 132 and 133).

The description given by Ditmar is clearer. The illustration in the original paper is apparently hand colored. The organism is described as very small, scarcely visible to the naked eye. Sporangia are single, occasionally three or four together. The sporangioles are readily visible through the parchment-like transparent membrane of the sporangium. The sporangium is spherical or ovoid, light citron yellow in color. Each sporangium contains 3 to 6 almost orange sporangioles filled with a somewhat granular mass but without definite "sporidia". The organism is found on decaying wood in swampy places in late summer and autumn.

Schroeter (1889) (3) described Cystobacter as a new genus of bacteria (in the order Eubacteria). His diagnosis of the genus bears some resemblance to that of Polyangium. It reads: Cystobacter n. g. Zellen in Form kurzer dünner Stäbchen, in eine verbreitete Schleimmasse eingebettet, später in längeren Fäden zusammenhängend. Die Schleimmasse theilt sich in unregelmässige rundliche Klumpen, welche sich später mit einer festen hornartigen structurlosen Hülle umgeben.

However, Thaxter (1892, p. 394) (4) states that "The species of Cystobacter Schröter seems with little doubt to belong to the present family, and should be referred to Chondromyces."

Thaxter (1892) in his paper on the new order of bacteria, the Myxobacteriales, included a description of a new genus and new species as follows:

Myxobacter n. gen. Rods forming large rounded cysts, one or more free within a gelatinous matrix raised above the substratum. Myxobacter aureus n. sp. Plate XXV, Fig. 34-36. Colonies when rising to form cysts milky white. Rods large, cylindrical, rounded at either end, 4-7 x .7-.9 μ . Cysts spherical or oblong, golden yellow, thick walled, one to twelve or more in number, distinct within a hyaline matrix,

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POLYANGIUM vitellinum. Link.**Gelbe Polhangie.****Tab. 27.****Minutum, sparsum, sporangio citrino, sporangiolis oviformibus subaurantiacis.****Klein, zerstreut wachsend, mit einer zitrongelben Sporangie und enartigen fast orangefarbenen Sporangiolen.****Link** Observat. in Ordin. plant. natur. Diss. I. p. 40. tab. 2. fig. 65.

Dieser Pilz ist sehr klein, so daß man ihn kaum mit bloßen Augen bemerken kann, und wächst fast immer einzeln, hin und wieder jedoch dreh bis vier zusammen. Die Sporangie besteht aus einer dünnen, pergamentartigen und stark durchscheinenden Haut, so daß man die Sporangiolen deutlich darinn wahrnehmen kann, ist kugelförmig oder enartig, an der Basis etwas flach, und von einer hellcitronengelben Farbe. Jede Sporangie schließt 3 bis 6 enartige fast orangefarbenen Sporangiolen ein, welche eine grumöse etwas körnige Masse, wie die Aegeriten enthalten und durchaus keine deutliche Sporeidien zeigen.

Auf verfaulten Holz an sumpfigen Orten ist dieser Pilz gegen Ende Sommers und im Herbst keine Seltenheit.

Fig. a. Die gelbe Polyangie in natürlicher Größe. B. Dieselbe stark vergrößert. C. Die Sporangiolen derselben, ebens falls stark vergrößert.

Fig. 2. Polyangium vitellinum. Reproduction of Ditmar's Figs. A, B and C.

75-350 x 75-275 μ . The encysted rods mingled with a yellow, oily material. Cyst groups .7-1 mm long.

On very wet wood and bark in swamps.

The Figures 34, 35 and 36 are herewith reproduced¹. The resemblance of Thaxter's description and illustration to Polyangium vitellinum are striking.

Zukal (1897)(5) called attention to the identity of Thaxter's species Myxobacter aureus with Link's Polyangium vitellinum.

Thaxter (1904, p. 406) (6) later accepted Zukal's emendation and quoted him to the effect that P. vitellinum had at various times been looked upon as a gasteromycete, a myxomycete and even as an insect egg.

Polyangium vitellinum has had an interesting history. At first placed among the fungi (the puff balls), it was finally recognized as a species belonging in the slime bacteria. It has the oldest valid name of any of the bacteria now recognized.

REFERENCES

1. Link, H. F. 1809. Observationes in Ordines plantarum naturales. Dissertation I. Complectens Anandrarum ordines Epiphytas, mucedines, Gastromycos et Fungos. Der Gesellschaft naturforschender Freunde zu Berlin MAGAZIN für die die neuesten Entdeckungen in der gesamte Naturkunde. 3:3-42. Plates I and II. Figs. 1-65.
2. Ditmar, L. P. F. 1813. Die Pilze Deutschlands, in Sturm, Jacob. Deutschlands Flora in Abbildungen nach der Natur mit Beschreibungen 3:55-56. Plate 27.

¹Reproduction of Figures 34, 35 and 36 of Plate XXV from Thaxter in the Botanical Gazette, Volume 17, pp. 389-406, 1892, is by permission of the publishers, The University of Chicago Press.

Plate XXV.

Myxobacter aureus n. sp.

Fig. 34. General habit showing four cysts embedded in gelatinous matrix. Fig. 35. Rods (living) from rising rod-mass. Fig. 36. Rods from cysts crushed at maturity.

Fig. 2. Thaxter's illustrations of Polyangium vitellinum Link (Myxobacter aureus Thaxter).

3. Schroeter, J. 1889. Die Pilze Schlesiens, Erste Hälfte. In Cohn, Ferdinand. 1889. Kryptogamen-Flora von Shlesien. Erste Hälfte Pilze. 3:170
4. Thaxter, Roland. 1892. On the Myxobacteriaceae, a new order of Schizomycetes. Bot. Gaz. 17:389-406.
5. Zukal, Hugo. 1897. Ueber die Myxobacterien. Ber. d. Deutschen Bot. Gesellsch. 15:550.
6. Thaxter, Roland. 1904. Notes on the Myxobacteriaceae 37:405-416. Plates XXVI and XXVII.